

**August 24-Month Study**  
**Date: August 16, 2021**

**From:** Water Resources Group, Salt Lake City  
**To:** All Colorado River Annual Operating Plan (AOP) Recipients

**Current Reservoir Status**

Reservoir	July Inflow (unregulated) (acre-feet)	Percent of Average (%)	August 15, Midnight Elevation (feet)	July 15, Midnight Reservoir Storage (acre-feet)
Fontenelle	45,400	26	6,493.97	245,100
Flaming Gorge	63,500	30	6,022.15	3,056,000
Blue Mesa	52,800	45	7,454.96	337,200
Navajo	23,900	36	6,033.40	1,043,000
Powell	208,800	19	3,551.22	7,672,800

**Expected Operations**

The operation of Lake Powell and Lake Mead in this August 2021 24-Month Study is pursuant to the December 2007 Record of Decision on Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations of Lake Powell and Lake Mead (Interim Guidelines), and reflects the 2021 Annual Operating Plan (AOP). Pursuant to the Interim Guidelines, the August 2020 24-Month Study projections of the January 1, 2021, system storage and reservoir water surface elevations set the operational tier for the coordinated operation of Lake Powell and Lake Mead during 2021.

The August 2020 24-Month Study projected the January 1, 2021, Lake Powell elevation to be below the 2021 Equalization Elevation of 3,659 feet and above elevation 3,575 feet. Consistent with Section 6.B of the Interim Guidelines, Lake Powell is operating under the Upper Elevation Balancing Tier for water year 2021. With an 8.23 million acre-foot (maf) release from Lake Powell in water year 2021, the April 2021 24-Month Study projected the end of water year elevation at Lake Powell to be below 3,575 feet. Therefore, in accordance with Section 6.B.1 of the Interim Guidelines, Lake Powell will continue to release 8.23 maf through the remainder of the water year 2021.

Consistent with Section 2.B.5 of the Interim Guidelines, the Intentionally Created Surplus (ICS) Surplus Condition is the criterion governing the operation of Lake Mead for calendar year 2021. In addition, Section III.B of Exhibit 1 to the Lower Basin Drought Contingency Plan (DCP) Agreement is also governing the operation of Lake Mead in calendar year 2021.

The August 2021 24-Month study projects the January 1, 2022, Lake Powell elevation to be less than 3,575 feet and at or above 3,525 feet and the Lake Mead elevation to be at or above 1,025 feet. Consistent with Section 6.C.1 of the Interim Guidelines the operational tier for Lake Powell in water year 2022 will be the Mid-Elevation Release Tier and the water year release volume from Lake Powell will be 7.48 maf.

The August 2021 24-Month Study projects the January 1, 2022 Lake Mead elevation to be at or below 1,075 feet and at or above 1,050 feet. Consistent with Section 2.D.1 of the Interim Guidelines, a Shortage Condition consistent with Section 2.D.1.a will govern the operation of Lake Mead for calendar year 2022. In addition, Section III.B of Exhibit 1 to the Lower Basin Drought Contingency Plan (DCP) Agreement will also govern the operation of Lake Mead for calendar year 2022.

The 2022 operational tier determinations for Lake Powell and Lake Mead will be documented in the 2022 AOP, which is currently in development.

Consistent with the Upper Basin Drought Response Operations Agreement (DROA) provisions to protect a target elevation at Lake Powell, this August 2021 24-Month Study includes releases from the upstream initial units of the Colorado River Storage Project Act to deliver an additional 181 thousand acre-feet (kaf) to Lake Powell by the end of December 2021. The additional releases began in July and will continue to be implemented on the following schedule:

#### **DROA Releases for the July 24MS Model Run**

	Jul	Aug	Sep	Oct	Nov	Dec	
	(kaf)	(kaf)	(kaf)	(kaf)	(kaf)	(kaf)	Sum
Flaming Gorge	13	42	43	27	0	0	125
Blue Mesa	0	14	18	4	0	0	36
Navajo	0	0	0	0	10	10	20
Sum:	13	56	61	31	10	10	181

The releases detailed above are in addition to the already established releases determined by operational plans for each of the identified facilities. The additional delivery of 181 kaf is expected to raise Lake Powell's elevation by approximately three feet. Releases from Lake Powell to Lake Mead will not be adjusted in water year 2021 as those releases are determined by annual release volumes consistent with the Interim Guidelines.

The 2021 AOP is available online at:

<https://www.usbr.gov/lc/region/g4000/aop/AOP21.pdf>.

The Interim Guidelines are available online at:

<https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>.

The Colorado River DCPs are available online at:

<https://www.usbr.gov/dcp/finaldocs.html>.

The Upper Basin Hydrology Summary is available online at:

[https://www.usbr.gov/uc/water/crsp/studies/24Month\\_08\\_ucb.pdf](https://www.usbr.gov/uc/water/crsp/studies/24Month_08_ucb.pdf).

**Fontenelle Reservoir** -- As of August 2, 2021, the Fontenelle Reservoir pool elevation is 6494.69 feet, which amounts to 75 percent of live storage capacity. Inflows for the month of July totaled 43,000 acre-feet (af) or 26 percent of average.

Due to dry hydrologic conditions in the Upper Green River Basin, Fontenelle's releases are projected to remain at 700 cfs through mid-August 2021. Based on the latest observed inflows for the period between April and July, this year's inflows into Fontenelle Dam ranked as the 6th driest since 1966.

The August final forecast for unregulated inflows into Fontenelle for the next three months projects dry conditions. August, September, and October inflow volumes amount to 27,000 af (35 percent of average), 25,000 af (55 percent of average), and 27,000 af (56 percent of average), respectively.

The April 22, 2021, Fontenelle Working Group meeting minutes are available online on USBR's website at <https://www.usbr.gov/uc/water/crsp/wg/ft/ftcurrnt.html>. The next Fontenelle Working Group meeting is scheduled for 10:00 am on August 26, 2021. Due to the ongoing COVID pandemic this meeting will be held virtually via WebEX. The Fontenelle Working Group is an open public forum for information exchange between Reclamation and other parties associated with the operation of Fontenelle Reservoir.

**Flaming Gorge** -- As of August 4, 2021, Flaming Gorge Reservoir pool elevation is 6022.91 feet, which amounts to 82 percent of live storage capacity. Unregulated inflow volume for the month of July is approximately 63,000 acre-feet (af), which is 30% of the average July unregulated inflow volume.

The August final forecast for unregulated inflows into Flaming Gorge for the next three months projects below average conditions. August, September, and October forecasted unregulated inflow volumes amount to 28,000 af (32% of average), 25,000 af (45% of average), and 32,000 af (54% of average), respectively.

The observed August water supply for the April through July unregulated inflow volume into Flaming Gorge Reservoir is 380,000 acre-feet (39% of average).

Pursuant to provisions of the Drought Response Operations Agreement (DROA), releases from Flaming Gorge are being increased to deliver an additional 125,000 af to Lake Powell by the end of October 2021. This decision was made in response to basin-wide drought and storage concerns at Lake Powell. The Flaming Gorge Operation Plan is currently being amended and releases will be made within the flexibility of the 2006 Flaming Gorge Record of Decision and within the provisions of the DROA. Reclamation and the Colorado Basin states remain committed to working together to develop future drought response plans.

Average daily release at Flaming Gorge for August is planned to be about 1,560 cfs to achieve approximately 1,700 cfs to 1,800 cfs in Reach 2.

Reclamation is planning to hold the next Flaming Gorge Working Group meeting on March 17, 2022 at 10:00 am MDT (tentative) via WebEx. The Flaming Gorge Working Group is an open public forum for information exchange between Reclamation and the stakeholders of Flaming Gorge Dam. The public is encouraged to attend and comment on the operations and plans presented by Reclamation at these meetings. Meeting notes from past Working Group meetings are posted on the Working Group webpage. For more information on this group and these meetings please contact Dale Hamilton at 801-379-1186.

**Aspinall Unit Reservoirs** – As of August 3, 2021 releases from Crystal Dam are approximately 1670 cfs. Gunnison Tunnel diversions are occurring and are currently about 1060 cfs and is near full capacity. Flows of the Gunnison River in the Black Canyon are being maintained at about 660 cfs.

The unregulated inflow volume in July to Blue Mesa was 52,800 af (45 percent of average). Unregulated Inflow volumes forecasted for Blue Mesa for the next three months (August, September, October) are projected to be: 38,000 af (60 percent of average), 28,000 af (73 percent of average) and 28,000 af (73 percent of average), respectively. The August 24-Month Study is reflective of these new forecasts.

The 2021 water year unregulated inflow volume is projected to be 519,216 af (54 percent of average). The water supply period (April-July) for 2021 observed 316,951 af of unregulated inflow (47 percent of average).

In August and September of 2021, average daily releases are scheduled to increase in response to a continual declining dry hydrologic condition for the Colorado River system. This drought operation is implemented under the Upper Basin Drought Response Operations Agreement. The maximum flexibility within the Record of Decision will be used. Notification of releases will occur prior to the scheduled release change.

Under the Aspinall FEIS/ROD, base flow minimum targets for flows measured in the Whitewater Reach of the Gunnison River are established for 6 separate categories of hydrological conditions. The category for this year is the dry category. The baseflow minimum target condition in the Whitewater Reach in years when the hydrologic category is dry, during the months of August through March, are to maintain a measured flow of 750 cfs. This is a minimum flow and all flows greater than this level are within the Aspinall FEIS/ROD. Projected flows in the Whitewater Reach under the DROA operation will range between 1000 and 1500 cfs during the months of August and September when additional water is released for DROA. This is within the constraints of the Aspinall FEIS/ROD.

Blue Mesa will not fill in water year 2021. Blue Mesa reached a peak elevation of 7,464.28 feet on June 22, 2021. The elevation is now declining and is projected to be about 7438 feet at the end of the water year. This will be down approximately 83 feet from the full pool elevation (7,519.4 feet) and water storage in Blue Mesa at this time will be approximately 248,000 acre-feet which is 30 percent of live capacity.

The Aspinall Unit Operations Group is an open public forum for information exchange between Reclamation and the stakeholders of the Aspinall Unit. The public is encouraged to attend and comments on the operations and plans presented by Reclamation at these meetings. Meeting notes from past working Group meetings are posted on the Operations Group webpage. For more information on this group and these meetings please contact Erik Knight in the Grand Junction Area Office at (970) 248-0629.

The next Operations Group meeting will be held on August 19, 2021 at 1:00 pm MDT. The meeting will be virtual. Contact Erik Knight in the Grand Junction Area Office at (970) 248-0629 to get the web address for the virtual Operations Group meeting or for additional information.

**Navajo Reservoir** – On August 9th, the daily average release rate from Navajo Dam was 700 cfs while reservoir inflow was averaging approximately 368 cfs. The water surface elevation was 6034.71 feet above sea level. At this elevation the live storage is 1.057 maf (62 percent of live storage capacity) and the active storage is 0.395 maf (38 percent of active storage capacity). The Navajo Indian Irrigation Project (NIIP) is diverting 494 cfs. The San Juan-Chama project is diverting 6 cfs from the basin above the reservoir.

Releases from Navajo Dam are made for authorized purposes of the Navajo Unit and are pursuant to the Record of Decision for the Navajo Reservoir Operations. Releases target the San Juan River Recovery Implementation Program's recommended downstream baseflow range of 500 cfs to 1,000 cfs through the critical habitat reach of the San Juan River (Farmington, NM to Lake Powell). Current modeling shows the release will most likely vary between 500 and 1,000 cfs to accomplish this for the remainder of summer.

Preliminary modified unregulated inflow (MUI) into Navajo in July was 24 kaf, which was 42 percent of average for the month. The volume released downstream totaled 35 kaf, which was 59 percent of average for the month. NIIP diverted a total of 45 kaf in July.

The final April-July MUI was 378 kaf, which was 51% of average.

The most probable MUI forecast for August, September, and October is 19,000 af (42 percent of average), 25,000 af (58 percent of average), and 30,000 af (64 percent of average), respectively.

In November and December of 2021, average daily releases are scheduled to increase in response to a continual declining dry hydrologic condition for the Colorado River system. This drought operation is implemented under the Upper Basin Drought Response Operations Agreement. The maximum flexibility within the Record of Decision will be used. Notification of releases will occur prior to the scheduled release change.

Reclamation conducts Public Operations Meetings three times per year to gather input for determining upcoming operations for Navajo Reservoir. Input from individuals, organizations, and agencies along with other factors such as weather, water rights, endangered species requirements, flood control, hydro power, recreation, fish and wildlife management, and reservoir levels, will be considered in the development of these reservoir operation plans. In

addition, the meetings are used to coordinate activities and exchange information among agencies, water users, and other interested parties concerning the San Juan River and Navajo Reservoir. The next meeting will be held virtually on Tuesday, August 24th, at 1:00 PM.

### **Glen Canyon Dam / Lake Powell**

#### **Current Status**

The unregulated inflow volume to Lake Powell during July was 209 thousand acre-feet (kaf) (19% of average). The release volume from Glen Canyon Dam in July was 767 kaf. The end of July elevation and storage of Lake Powell were 3553.88 feet (146 feet from full pool) and 7.87 million acre-feet (maf) (32% of live capacity), respectively.

#### **Current Operations**

The operating tier for water year 2021 (September 2020 through October 2021) was established in August 2020 as the Upper Elevation Balancing Tier, consistent with Section 6.B of the Interim Guidelines. Consistent with Section 6.B of the Interim Guidelines, Lake Powell's operations in water year 2021 will be governed by the Upper Elevation Balancing Tier. With an 8.23 maf release from Lake Powell in water year 2021, the April 2021 24-Month Study projected the end of water year elevation at Lake Powell to be below 3,575 feet. Therefore, in accordance with Section 6.B.1 of the Interim Guidelines, Lake Powell will continue to release 8.23 maf through the remainder of the water year 2021.

In August the release volume will be approximately 801 kaf, with fluctuations anticipated between about 8,252 cubic feet per second (cfs) in the nighttime to about 16,252 cfs in the daytime, and consistent with the Glen Canyon Dam, Record of Decision (dated December 2016). The anticipated release volume for September 2021 is 623,000 af.

In addition to daily scheduled fluctuations for power generation, the instantaneous releases from Glen Canyon Dam may also fluctuate to provide 40 megawatts (mw) of system regulation. These instantaneous release adjustments stabilize the electrical generation and transmission system and translate to a range of about 1,100 cfs above or below the hourly scheduled release rate. Under system normal conditions, fluctuations for regulation are typically short lived and generally balance out over the hour with minimal or no noticeable impacts on downstream river flow conditions.

Releases from Glen Canyon Dam can also fluctuate beyond scheduled releases when called upon to respond to unscheduled power outages or power system emergencies. Depending on the severity of the system emergency, the response from Glen Canyon Dam can be significant, within the full range of the operating capacity of the power plant for as long as is necessary to maintain balance in the transmission system. Glen Canyon Dam currently maintains 30 mw (approximately 800 cfs) of generation capacity in reserve in order to respond to a system emergency even when generation rates are already high. System emergencies occur infrequently and typically require small responses from Glen Canyon Dam. However, these responses can have a noticeable impact on the river downstream of Glen Canyon Dam.

### **Inflow Forecasts and Model Projections**

The forecast for water year 2021 unregulated inflow to Lake Powell, issued on August 3, 2021, by the Colorado Basin River Forecast Center, projects that the most probable (median) unregulated inflow volume this year will be 3.44 maf (32% of average).

In addition to the August 2021 24-Month Study based on the Most Probable inflow scenario, and in accordance with the Upper Basin Drought Response Operations Agreement (DROA), Reclamation has conducted model runs in August to determine a possible range of reservoir elevations under probable minimum and probable maximum inflow scenarios. Probable minimum and probable maximum model runs are conducted in January, April, August, and October. The probable minimum inflow scenario reflects a dry hydrologic condition which statistically would be exceeded 90% of the time. The most probable inflow scenario reflects a median hydrologic condition which statistically would be exceeded 50% of the time. The probable maximum inflow scenario reflects a wet hydrologic condition which statistically would be exceeded 10% of the time. There is approximately an 80% probability that a future elevation will fall inside the range of the minimum and maximum inflow scenarios. Additionally, there are possible inflow scenarios that would result in reservoir elevations falling outside the ranges indicated in these reports.

The DROA coordination will continue until either (i) the minimum probable projected elevation remains above 3,525 feet for 24 months or (ii) the process moves to the next step when the most probable projected elevation indicates Powell elevations below 3,525 feet and a Drought Response Operations Plan is developed.

The August forecast for water year 2022 ranges from a minimum probable of 4.67 maf (43% of average) to a maximum probable of 15.9 maf (147% of average) with the most probable forecast for water year 2022 of 8.20 maf (76% of average). There is a 10% chance that inflows could be higher than the current maximum probable forecast and a 10% chance that inflows could be lower than the minimum probable forecast.

Based on the current forecast of 8.20 maf unregulated inflow for water year 2022, the August 24-Month Study projects Lake Powell elevation will end water year 2022 near 3,540.25 feet with approximately 6.91 maf in storage (28% of capacity). Note that projections of elevation and storage for water year 2022 have significant uncertainty at this point in the season. Projections of end of water year 2022 elevation and storage using the minimum and maximum probable inflow forecast from and results from the August 2021 model runs are 3,503.73 feet (4.70 maf, 19% of capacity) and 3,614.69 feet (13.21 maf, 54% of capacity), respectively. Under these scenarios, there is a 10% chance that inflows will be higher, resulting in higher elevation and storage, and 10% chance that inflows will be lower, resulting in lower elevation and storage. The annual release volume from Lake Powell during water year 2022 will be 7.48 maf as determined under Section 6.C.1 of the Interim Guidelines.

### **Upper Colorado River Basin Hydrology**

Upper Colorado River Basin regularly experiences significant year to year hydrologic variability. During the 21-year period 2000 to 2020, however, the unregulated inflow to Lake Powell, which is a good measure of hydrologic conditions in the Colorado River Basin, was above average in

only 4 out of the past 19 years. The period 2000-2020 is the lowest 21-year period since the closure of Glen Canyon Dam in 1963, with an average unregulated inflow of 8.62 maf, or 80% of the 30-year average (1981-2010). (For comparison, the 1981-2010 total water year average is 10.83 maf.) The unregulated inflow during the 2000-2020 period has ranged from a low of 2.64 maf (24% of average) in water year 2002 to a high of 15.97 maf (147% of average) in water year 2011. In water year 2018 unregulated inflow volume to Lake Powell was 4.6 maf (43% of average), the third driest year on record above 2002 and 1977. Under the current most probable forecast, the total water year 2021 unregulated inflow to Lake Powell is projected to be 3.44 maf (32% of average).

At the beginning of water year 2021, total system storage in the Colorado River Basin was 28.88 maf (48% of 59.6 maf total system capacity). This is a decrease of 2.77 maf over the total storage at the beginning of water year 2020 when total system storage was 31.64 maf (53% of capacity). Since the beginning of water year 2000, total Colorado Basin storage has experienced year to year increases and decreases in response to wet and dry hydrology, ranging from a high of 94% of capacity at the beginning of 2000 to the now current level of 48% of capacity at the beginning of water year 2021. Based on current inflow forecasts, the current projected end of water year total Colorado Basin reservoir storage for water year 2021 is approximately 22.77 maf (38% of total system capacity). The actual end of water year 2021 system storage may vary from this projection, primarily due to uncertainty regarding this season's runoff and reservoir inflow.